Successful Methods

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Afraid of the Dark?

THOSE who are pushing outdoor jobs to finish before cold weather ought to consider a night shift. Modern lighting methods make it possible to do a great deal of such work with little or no loss of efficiency. In fact, there are cases where congested traffic or other handicaps make night work the cheapest. But it is by no means the big jobs nor the exceptional conditions on which a night shift is advisable. This is specially so at this season of the year. There are thousands of medium and small-sized jobs all over the north and east that cold weather is likely to catch, but which a night shift could finish.

To most construction men night work calls for electric power and an elaborate system of lighting. There are some big jobs on which operations are to be conducted at night for several months on which a somewhat permanent system of electric lighting is desirable. Portable acetylene lights, have, however, been so well developed in recent years that they meet outdoor construction requirements admirably. They require a small investment, can be handled by unskilled labor and are quickly and easily shifted.

A good example of how such lights could be used just now came to our attention last week on a two-mile road job in the southeastern mountains.

The day we visited the job a broken crane rope meant that little work was done before noon. By dusk at 6.30 the whole outfit was going strong. Half a dozen portable lights would have meant two or three hours' more work from the day shift without a murmur. Or a night shift could have carried right on, and cut the time required by half.

As it is, this job will be in luck if it is finished this fall. A small investment in portable lights, and only slightly less efficient work at night would insure the contractor against being tied up over the winter. Any man who has had to stick by a job until spring to finish 10 to 15 per cent of it knows what it costs to do so.

While there is still time to get the benefit of a night shift, it will be well to consider the idea. The day has passed when construction men need to be afraid of the dark.

The Coming Highway Problems

GREAT progress has been made in highway engineering in this country in recent years. As one noted engineer recently put it, our knowledge of road building is 300 to 400 per cent ahead of what it was just after the war. There is, however, still vast room for advancement in methods of designing, building and maintaining roads and road structures. On the other hand, the great problems of highway development in this country in the next few years will be those of economics and finance.

An expenditure of $5,000,000,000 in the last five years for building rural roads is without precedent. Whether that rate of construction will be maintained remains to be seen. Even though there may be some slackening of the pace, already it is evident that the financing of such a total will be a tremendous task.

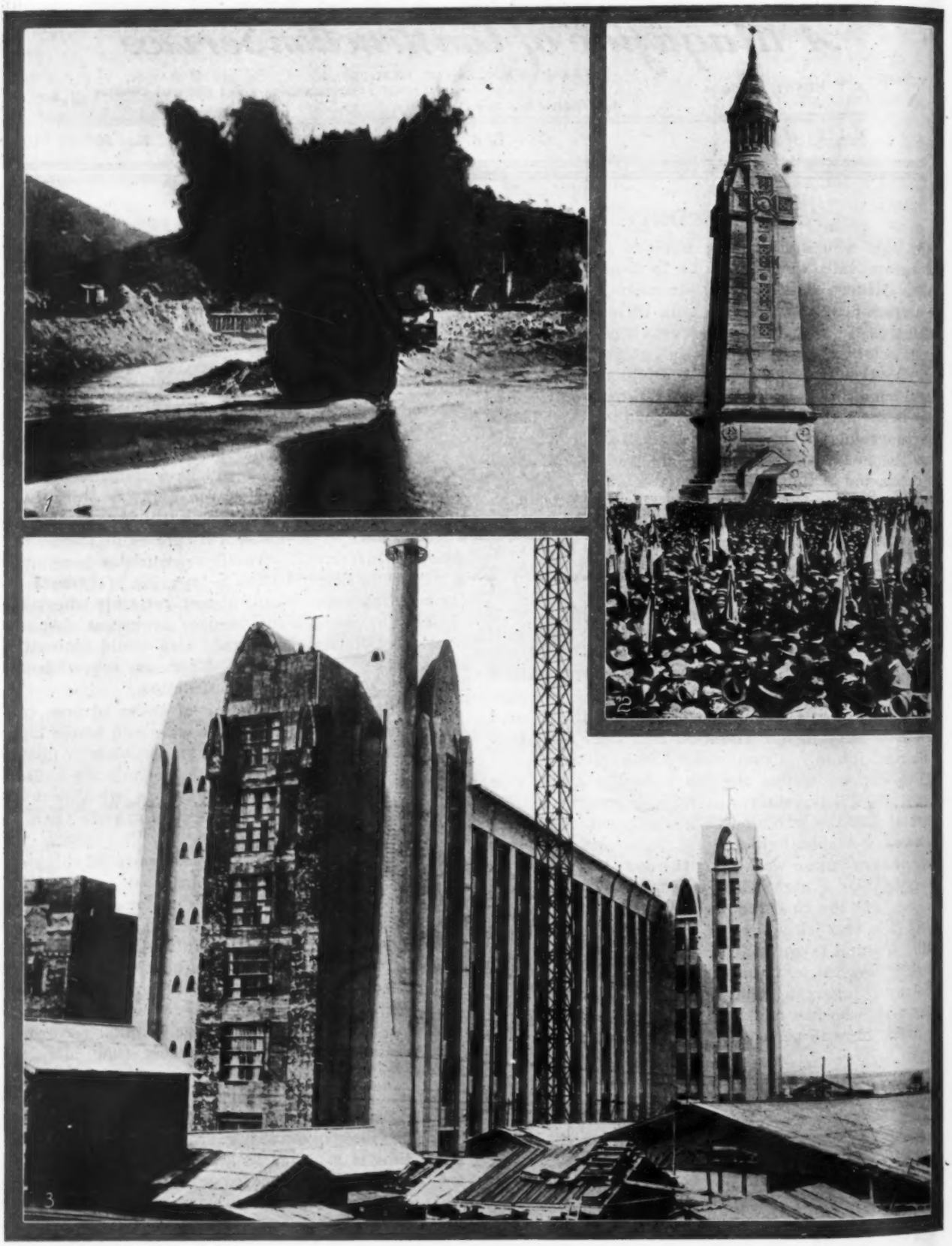
County and State bonds for highway work have thus far been well absorbed, with few exceptions. There is also at the moment a surplus of idle money awaiting investment. Tax-free securities have until now been in demand. But a lowering of Federal income surtax rates would almost certainly affect adversely the market for tax-free securities. An expansion of industry and trade also would automatically increase interest rates. There are other adverse factors that enter into the situation.

Even though a combination of these adverse conditions occurs, the demand for more and better highways will require a solution of the problem of financing the work. None of those in intimate contact with the popular opinion questions whether road work will proceed on a vast scale for some years to come.

In a similar manner, the economics of highway transport are looming in an immense way. All of us see constantly about us how motor vehicles have revolutionized living conditions and industry. Men who have devoted their lives to a study of highway transport are, however, convinced that the changes will be more rapid and more far-reaching than they have been. They are further convinced that the problems to be solved are those requiring commercial training and experience rather than merely a knowledge of engineering.

While each of us is busy with today's job, it is wise to be looking ahead. Time goes rapidly. At the rate that highway progress has occurred not much time is required to bring great changes in the needs for men qualified to meet the problems that must be solved. With the financial and commercial problems becoming more serious than those of engineering, it is in the solution of them that the larger opportunities will lie.

The Path of Construction



1. In the interests of shortening a railroad the course of the Schuylkill River is being changed near Port Clinton, Pa. This photograph shows part of the present operation. © *P. & A.*
2. The dedication of the monument near Vimy Ridge, France, built as a memorial to the Canadians who died in the Great War. © *P. & A.*
3. The new Central telegraph office in Tokio built since the earthquake. © *P. & A.*

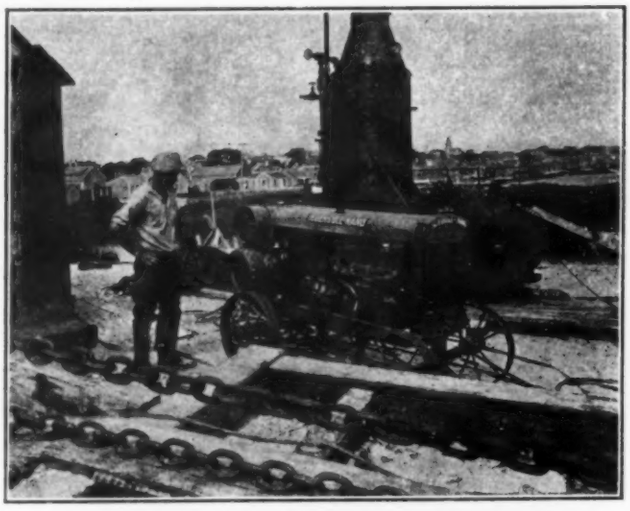
Leads Around the World

4. Safety nets installed on the Philadelphia-Camden bridge at the suggestion of Coroner Patton of Philadelphia. © *P. & A.*
5. President Doumergue of France with his official party at the inauguration of a new sanatorium in the Alps for French students. © *Keystone*
6. A construction business founded in 1108. The firm of Farman & Sons began business in that year at North Walsham in England and have been supplying thatching for roofs ever since. © *P. & A.*

DOING AN OLD JOB IN A NEW WAY

Air and Water Method of Pile Driving Works Well on Nantucket Island

DRIVING piling is an old story to the natives of Nantucket as the situation of the island in the Atlantic Ocean off the Massachusetts coast has made work of that kind necessary ever since Colonial days. Therefore, when a new method of doing such work is adopted on Nantucket, it is pretty safe to say that it has proved a complete success.



THE COMPRESSOR WHICH FURNISHES THE AIR

The South Beach Boat Yard recently undertook the construction of a new bulkhead in hard packed beach sand, and instead of driving the piling in the old way, tried out what can best be described as the "air and water" method, making use of compressed air in conjunction with a jet of water to clear the way for the piles, which are then tapped into place.

In constructing the bulkhead two 4 by 6-in. stringers are secured fast 3 in. apart parallel to each other on the ground. Two more are fastened in a similar manner at a suitable distance directly above and the planks to be driven are inserted vertically between them. The groove in each edge of each pile is 1 in. by 1 in. making a hole between planks 1 in. by 2 in., in which a spline is set at the time the

BOTH AIR AND WATER HELP TO CLEAR WAY FOR PILING

planks are ready to be driven. A tripod constructed of 4 by 6-in. stringers supporting a pulley block which suspends the driving weight is then set up over the

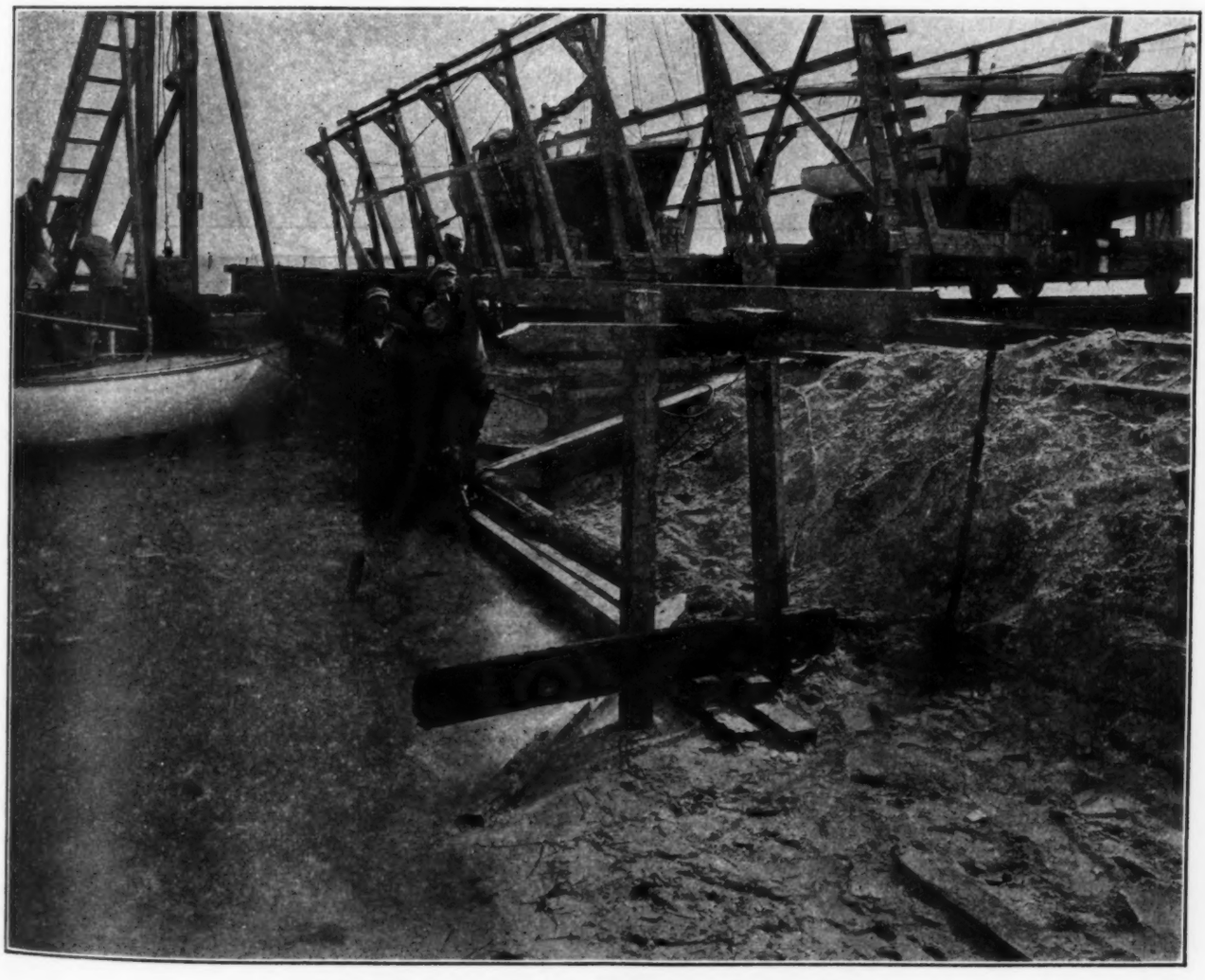
BORING THE BOLT HOLES

top of the piles. The driving weight consists of a wooden block with an iron shoe 125 lb. in weight and

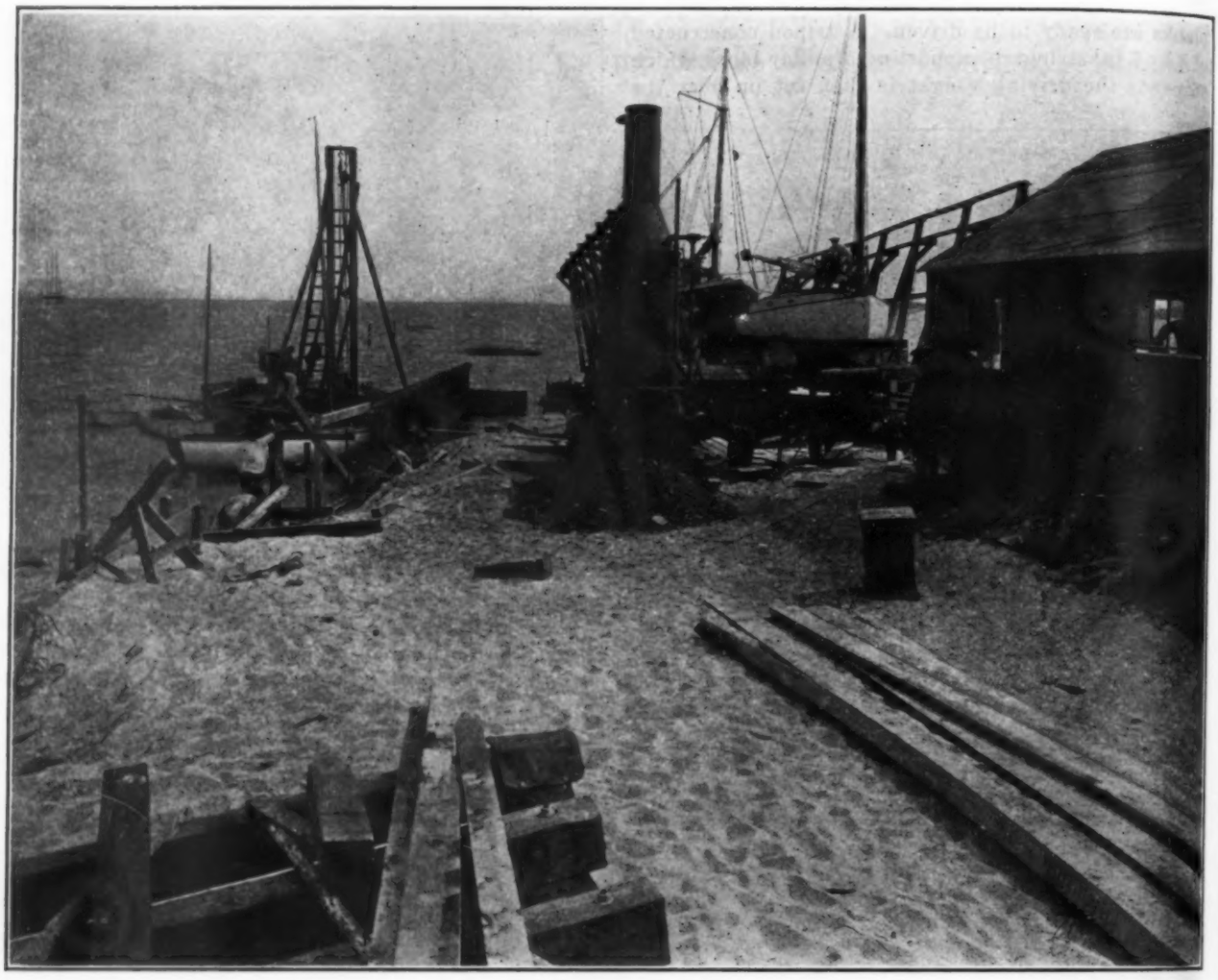
A SECTION OF THE FINISHED BULKHEAD

is raised by a steam operated winch. The tripod is easily moved and set in place by two men.

The "air and water" device, which is shown in the large photograph at the bottom of page 4 consists of a 6-ft. length of ¾-in. galvanized pipe with a ⅜-in. air connection in the top and a ½-in. water connection



SETTING UP STRINGERS BEFORE DRIVING PILING



A GENERAL VIEW OF THE JOB

set horizontally immediately below it. The water is piped from the water main and has a pressure of about 40 lb. The air is used at a pressure of about 90 lb. supplied by an Ingersoll-Rand portable compressor which can be moved without difficulty to any desired position near the work. The 6-ft. pipe is stuck into the sand, as shown in the photograph and the air and water turned on. It rapidly clears a hole about 2 ft. square into which the piles are tapped by the wooden block. The heavier gravel and stones either are washed out of the hole or the sand is washed out from under them and they fall to the bottom, thus getting out of the way of the direct downward path of the pile.

This method worked as well in dry sand as in wet. Stringers long enough to allow the placing of about 28 piles easily were set up at one time together with a corresponding number of splines and with the aid of the "air and water" device were rapidly driven to the required depth of 4 ft. beneath the surface of the sand.

When the driving is completed a pneumatic drill is used to bore ½-in. holes through the stringers as near as possible to the last pile driven. Half-inch bolts are then driven through these holes and secured. Wedges are then placed and driven between the bolts and the piling, thus forcing the bulkhead together and making it watertight.

Half-inch holes then were bored at suitable intervals through which 12-in. bolts are driven tying the whole bulkhead together. The bulkhead is prevented from bulging outward by 12-ft. iron rods 1 in. thick which pierce the sides and are attached to a dead man that is buried and staked into the beach before the bulkhead is filled.

A drag scoop is used to haul sand from the front of the beach to fill the bulkhead. The outer end of this rig is attached to an anchored raft. About 330 ft. of this bulkhead was constructed and the gang on the job consisted of six men, three of whom cut and carried timber while the other three set the stringers in place and drove the piling. The average time for sinking a single pile was 10 min., although usually two or three were driven at once.

The "air and water" method had the added advantage of making it possible to drive the piling without danger of splitting the tops. No trimming whatever was necessary.

The work was in charge of B. Dunham who has had a part in driving piles on Nantucket Island for a number of years, and H. V. Chase, Superintendent of the South Beach Boat Yard.

AMERICAN ROAD BUILDERS PLAN FOR BIGGEST CONVENTION AND ROAD SHOW

THE Annual Convention and Road Show of the American Road Builders' Association, which has come to be the great gathering point for those engaged in road construction in every part of the country, gives every indication of being bigger and better than ever in 1926. As previously announced the week of January 11 has been selected for the 1926 Convention and Show.

Applications for space from prospective exhibitors are being received daily and the drawing for space will be held in Chicago Nov. 2. Last year the space available was heavily over subscribed and it looks as though the story would be repeated.

Charles M. Upham, business director of the Association, was injured recently in an automobile accident, but the arrangements for the Convention and Road Show were so well organized that his enforced absence while he was in the hospital did not make any changes in the plans. Everything is going along according to Mr. Upham's original schedule.

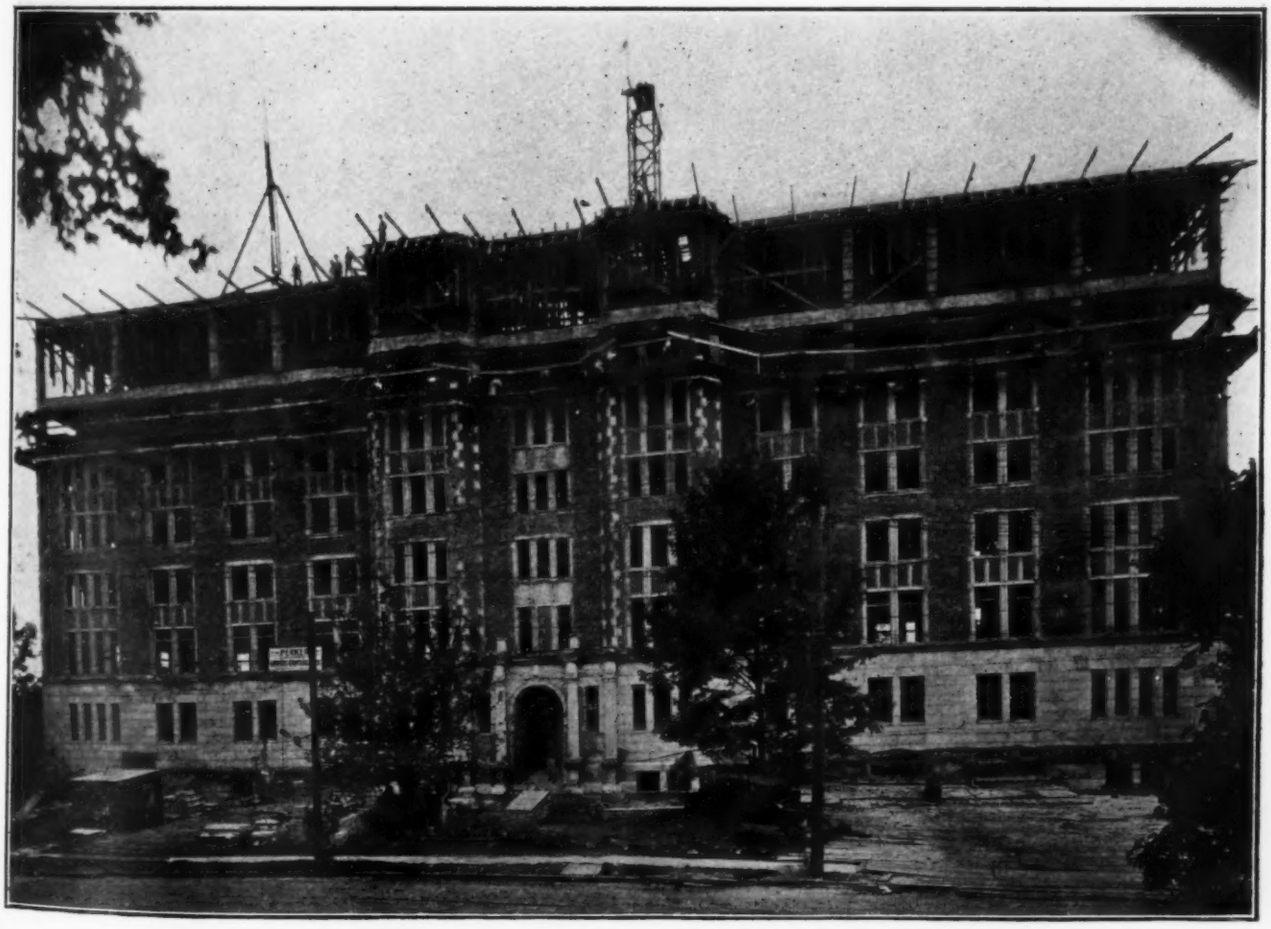
ELECTRIC HOISTS HANDLE MATERIAL ON NEW HOSPITAL

Cincinnati Contractor Makes Good Progress on Eight-Story Building

THE photograph at the bottom of this page shows the 8-story addition to the Bethesda Hospital at Cincinnati, Ohio. This building is being constructed by Max Penker & Sons Co. of Cincinnati, a contracting organization which has handled a number of important jobs in that section of the country. At present every effort is being made to finish the job before the cold weather sets in and it is expected that this result will be accomplished.

In getting the material into place two Clyde electric hoists are being used. A double-drum 30-hp. hoist is handling the elevator in the concrete tower and the tower boom. A single drum reversible hoist takes care of the double cage brick elevator. This machine is one of a type which is used a great deal on the Pacific Coast but the one owned by the Penker organization is the first of its kind in the Cincinnati territory.

Both hoists have done their work efficiently and have been largely responsible for the good progress made in the construction of the hospital.



ADDITION TO BETHESDA HOSPITAL IN CINCINNATI NOW NEARING COMPLETION

SMALL DITCHER GOES OUT OF ITS CLASS

Digs Thirty-two Inch Trench by Doubling Back and Enlarging Previous Cut

A GREAT increase in the number of new homes constructed means a corresponding expansion of public service facilities. In Birmingham, Ala., several thousand new dwelling houses have been built in the last year and the Birmingham Electric Company has had to keep pace with the city's growth. This has necessitated the construction of a new gas holder with a capacity of 5,000,000 cu. ft. in North Birmingham and the installation of a large number of new gas mains including a 24-in. cast iron main from the site of the new holder to the high pressure gas feeders which supply the eastern section of the city.

WIDENING TRENCH BY CUTTING AWAY ONE SIDE

The construction program also includes the installation of a long 12-in. main in order to serve some of the newly developed sections of the city. The photographs which accompany this article show the construction of the 24-in main and illustrate the adaptability of the Barber-Greene ditcher

DITCHER AT WORK WIDENING PREVIOUS CUT

COMPLETED TRENCH WITH 24-IN. PIPE IN PLACE

which was used for the work. This machine was purchased with the expectation that it would not be called upon to cut ditches more than 18 in. in width. It dug the long ditch for the 12-in. main and then was sent over to tackle the job of cutting the ditch for the 24-in. main.

This ditch, because of the size of the main, had to be 32 in. in width, and the method adopted was to cut the ditch the standard 18-in. width and then to run the ditcher back, cutting the additional 14 in. from one side of the ditch.

When this method was determined upon the engineering officials of the gas company were not certain of its feasibility but their doubts soon were set at rest by the way the ditcher performed. It made a clean cut to the desired width.

The small photograph at the top of page 8 shows the ditcher in action cutting the additional 14 in. from one side of the previously dug ditch. The large photograph at the bottom of the same page shows the ditcher and the method of shoring used to support the side walls of the trench. The photograph at the top of this page shows the 24-in. main in place in the bottom of the trench.

TO INVESTIGATE PROBLEMS OF HIGHWAY FINANCE

Charles M. Upham, Director of the Highway Research Board of the National Research Council, has announced that a new investigation of the urban highway financial problem has been begun by the board. This work is in charge of Jacob Viner, Professor of Government Finance at the University of Chicago and a consulting expert on financial problems.

The objects of the investigation are to determine the relation of city dwellers to the rural financial problem, to investigate problems of city street finance, including the financial problems of construction, maintenance and widening of city streets, and to study the financial aspects of city traffic control. Professor Viner will present his report to the fifth annual meeting of the Highway Research Board to be held in Washington Dec. 3 and 4, 1925.

FIVE TENTS TO HOUSE PACIFIC COAST ROAD SHOW

ARRANGEMENTS have been made for housing the Pacific Coast Road Show, which is to be held in San Francisco the second week in November, in five great tents. The show will be kept open for five full days, beginning on Monday, Nov. 9 and ending Friday, Nov. 13. It also probably will be kept open Saturday morning.

In addition to the show, a number of meetings will be held. A convention hall has been obtained for these gatherings.

SHOVEL STRADDLES CURB ON STREET WIDENING JOB

High Clearance Permits Use of Unusual Method of Handling Work

A STREET widening job was handled recently in rather unusual but successful fashion by F. C. Traxler of Lorain, Ohio. His contract called for the widening of Twenty-eighth Street in Lorain, 5 ft. on each side and in order to cut down to grade outside the existing curb he used a ½-yd. Thew shovel.

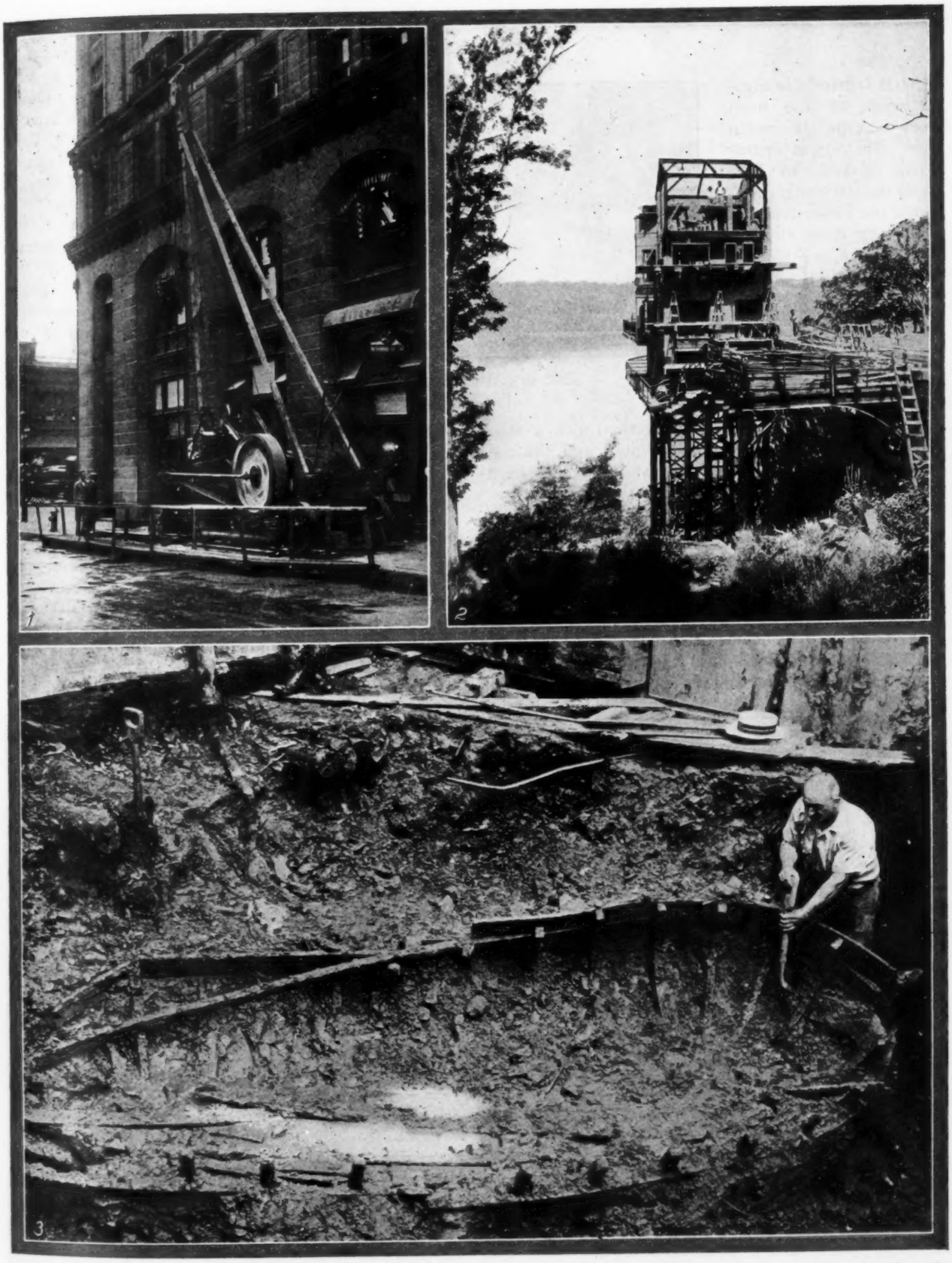
The photograph at the bottom of the page shows clearly the method devised by Mr. Traxler. One side of the continuous tread rested on the pavement and the other tread was supported by a 12-in. square block laid down in front of the shovel. Only two of these blocks were necessary, the rear block as soon as released being carried around the shovel and set down in front.

The shovel loaded the material into horse-drawn wagons and advanced at the rate of 95 to 100 lin. ft. per hour. The street was about a mile in length necessitating two miles of this work. When intersecting streets were reached, the shovel left the blocks, crossed on the intersecting pavement and started digging on the other side.

When a hard cement or asphalt driveway was reached, another unusual method was used to break it up. Mr. Traxler hitched a skull cracker trigger to one of his dipper teeth and then raised the skull cracker to the extreme limit of the dipper height and pulled the trigger. By swinging the boom he was able to place the skull cracker over the exact spot necessary. The resulting blow shattered the pavement.

LEFT TREAD RESTS ON PAVEMENT, RIGHT ON WOOD BLOCK

In Little Old New York



1. Not content with New York's regular water supply, a downtown corporation is drilling an artesian well under the sidewalk outside its building. © *P & A*
2. There is something new to be seen every day in New York. Even the natives drive up Riverside Drive to look at the latest house on stilts. © *International*
3. An old Dutch boat was dug up recently in excavating for a building near the waterfront. © *P & A*

MODERN HIGHWAYS IN AUSTRALIA

Concrete Base with Asphalt Surface Adopted for Repaving Important Thoroughfare

THE demand for highways of the most modern type is world wide. The city of Brunswick, Victoria, in Australia has recently completed the reconstruction of Sydney Road and the photographs which accompany this article give a good idea of the methods used.

THE FINISHED PAVEMENT

The new pavement is 17,285 ft. in length and 10 ft. wide each side of the car tracks which are in the center. A concrete foundation with a sheet asphalt surface was the type adopted and the new pavement is said to be the first sheet asphalt highway in that section of the world.

The design called for a concrete foundation 6 in. thick laid on 3 in. of ashes. The mix was 1:2½:5 and a steel fabric reinforcing was placed 2 in. from the bottom. On top of the concrete a cross binder 1½ in. thick was laid with 1½ in. of sheet asphalt on top.

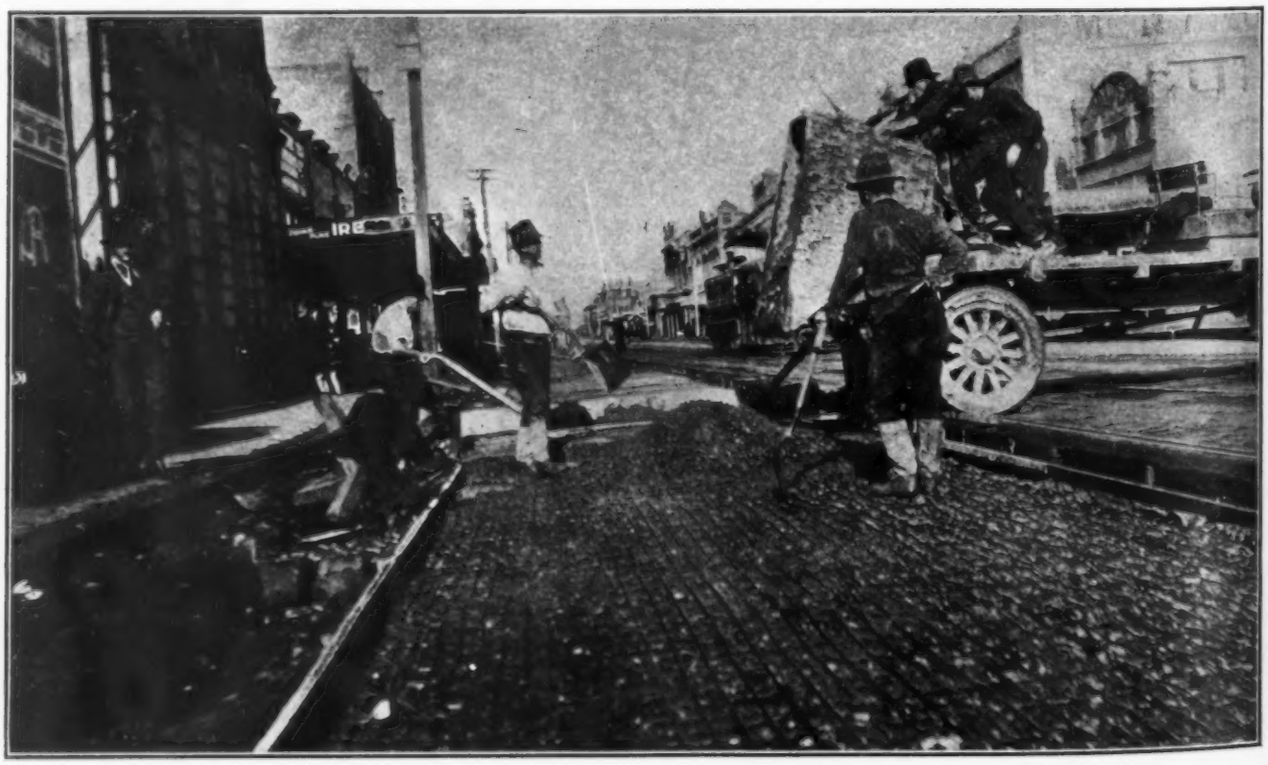
Because of the narrowness of the road and the heavy traffic, it was decided to set the mixer in out of the way places and to haul the wet mix in small trucks. Both the mixer and the small trucks were made in the United States.

The work was done by J. E. and W. B. Carr, general construction contractors of Melbourne and was under the charge of Emmett Brooks Gavin, general construction engineer of San Francisco. The photographs which accompany this article show the work in progress and a view of the completed street.

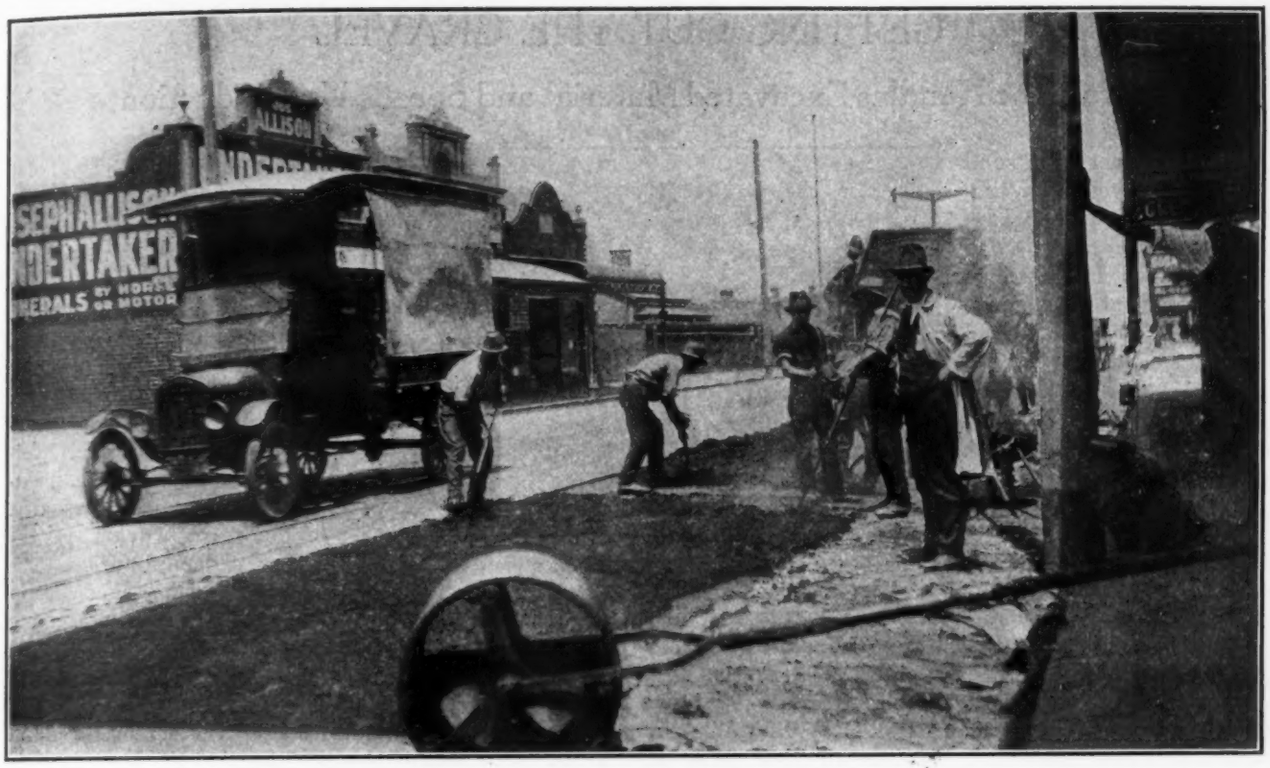
The large photograph at the bottom of this page gives a good idea of the way the concrete was handled. The trucks wheeled into place and right angles to the cable car tracks and dumped the wet concrete on the road.

Two shovelers leveled it off and two more men finished it by hand. At the top of page 13 the surfacing gang is shown in action. The asphalt was brought from the plant in trucks and placed on the previously prepared concrete foundation. Mr. Gavin is the man standing in the foreground at the right of this picture.

Both photographs show traffic passing on the opposite side of the street. Keeping the road open continuously during the entire progress of the job fully



LAYING CONCRETE BASE. WET CONCRETE BROUGHT FROM MIXER HALF A MILE AWAY IN SMALL TRUCKS

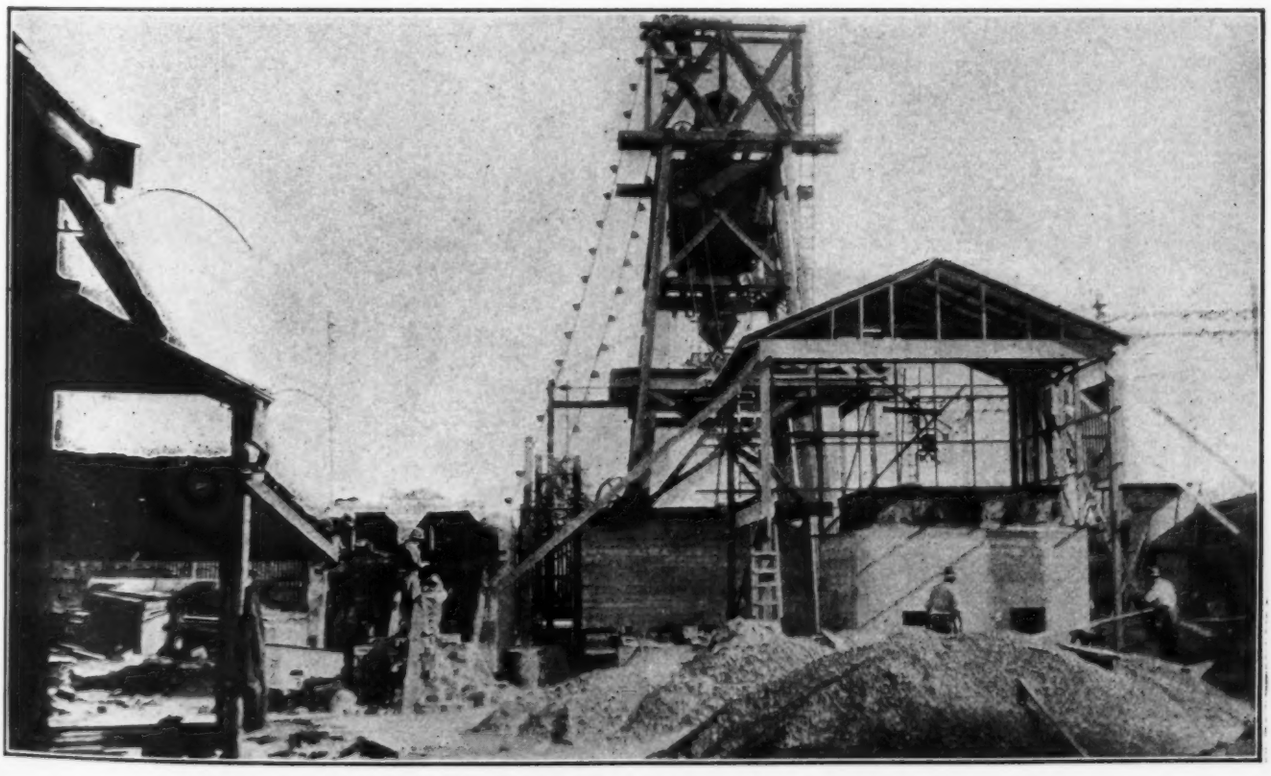


LAYING THE SHEET ASPHALT SURFACING

justified the adoption of the methods used on the job.

The photograph at the bottom of this page shows a 1250 yd. asphalt plant, which is being built in the City of Richmond, Victoria, by the Carr organization.

This plant will be equipped with two 1200-gal. asphalt kettles, a rotary asphalt pump, dryers, hot storage bin, weigh box scales and mixer. The plant is operated by a 50-hp. General Electric motor which is housed in the small structure at the extreme right of the photograph. Mr. Gavin also is in charge of this work. The new plant will furnish the asphalt for the city's paving program.

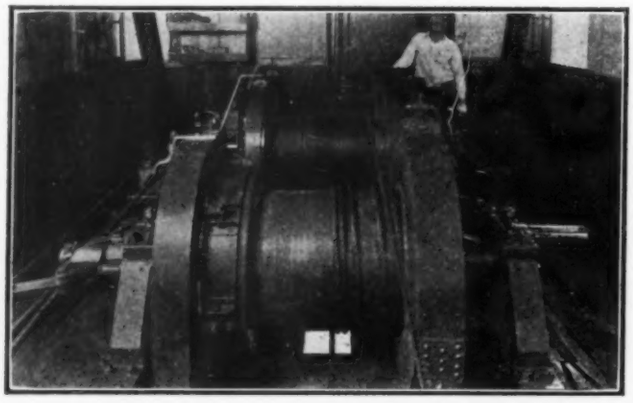


MODERN ASPHALT PLANT FOR CITY OF RICHMOND, VICTORIA, AUSTRALIA

GETTING OUT THE GRAVEL

Drag-line Handles Excavated Material and Speeds Up Production

THE production of sand and gravel is an important part of the construction industry, and from time to time methods and equipment used in the production of sand and gravel have been described in SUCCESSFUL METHODS. In the western section of Ohio the hydraulic method of getting out sand is in general use and the Keystone Gravel Company of Dayton is producing its materials for use in construction work in this manner.



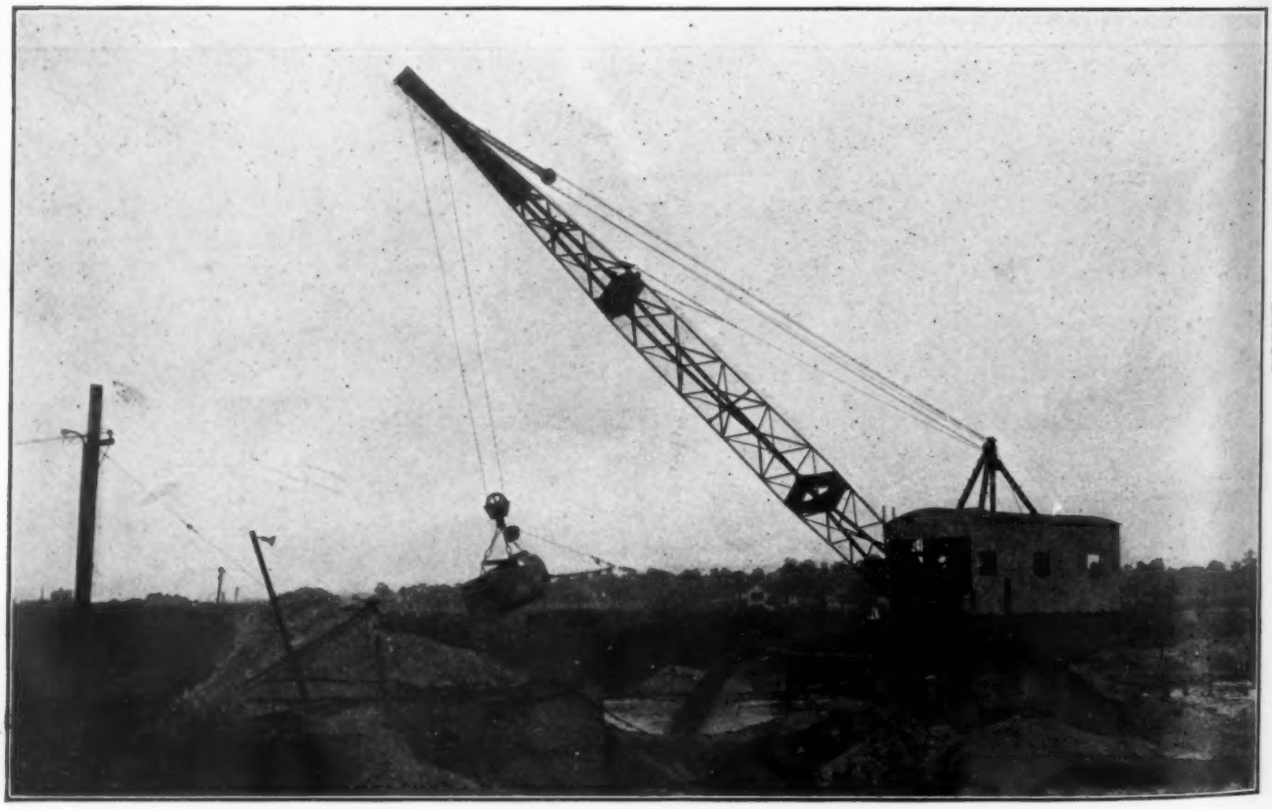
TRIPLE DRUM HOIST WHICH OPERATED DRAGLINE

This method of mining the sand makes it necessary to provide a means of transferring the excavated material to the screening plant and for this purpose the Keystone Company has installed a Wiley Whirley crane and dragline unit. This machine, as shown in the photograph at the bottom of the page, is placed on a concrete pedestal. The sand and gravel are then pumped and discharged into piles about the base of the pedestal. The machine then picks up the gravel and deposits it on a belt conveyor which carries it to the screening plant.

A special Clyde hoist has been designed to operate this unit which is a one man machine. This hoist, which operates the main bucket, is a special three drum compound geared electric hoist equipped with a 75 hp. motor. The special gearing gives the proper loading speed with the maximum loading capacity. The front drum is the bucket loading drum. The middle drum takes care of the hoisting and the rear drum is the boom peaking drum. The swing is handled by a special engine.

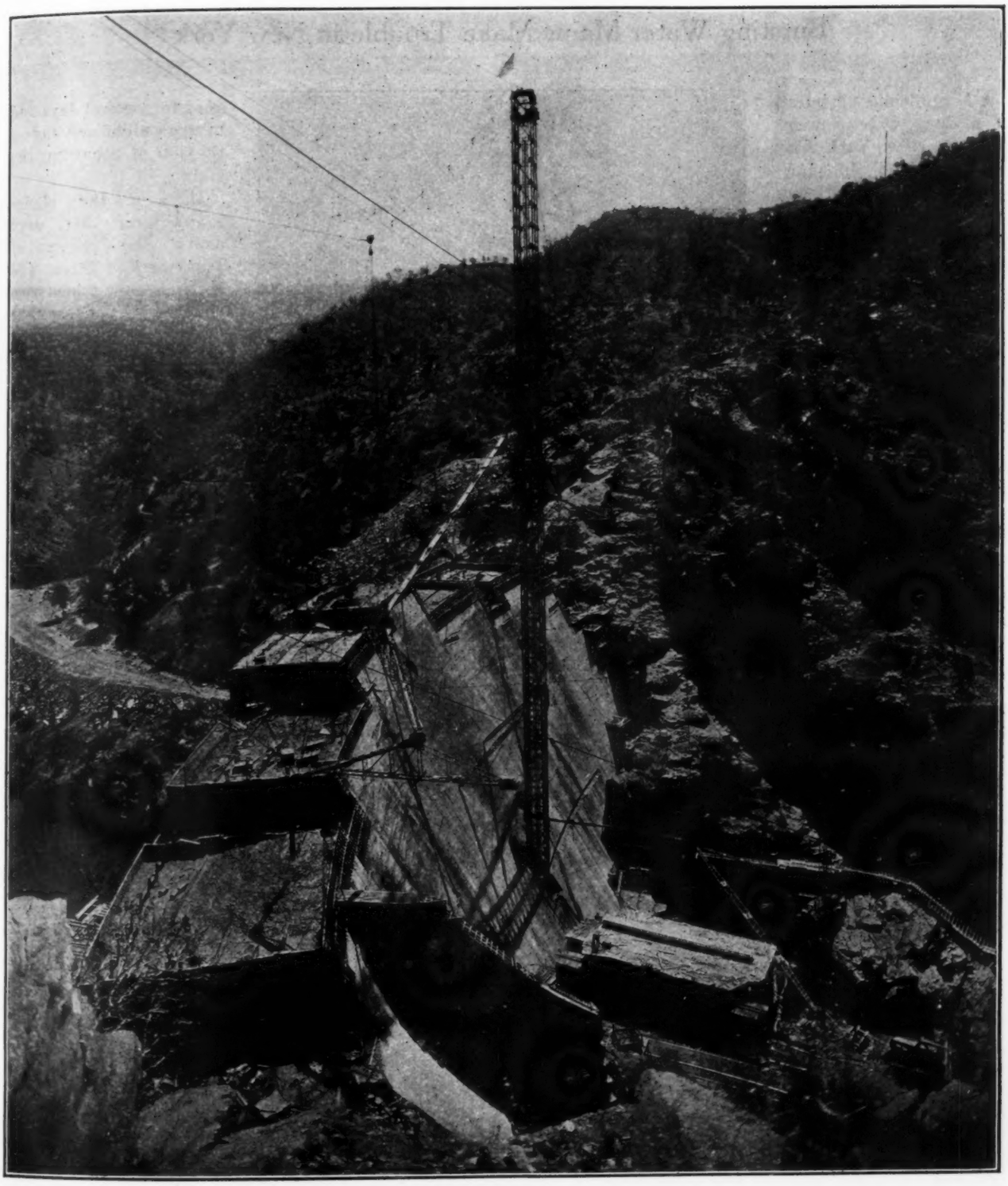
The photograph shows a machine at the moment of dumping a bucket load of gravel into the hopper of the conveyor which carries it to the screening plant. Below the boom of the machine, one of the big pipes may be seen depositing sand, gravel and water.

Since this equipment was installed, the capacity of the Keystone plant has been greatly increased and under the present method of operation, a monthly output of more than 35,000 tons of marketable material is maintained.



DRAGLINE WHICH PICKS UP GRAVEL AND DEPOSITS IT ON CONVEYOR TO SCREENING PLANT

ONE YEAR'S PROGRESS



ONE of the biggest construction jobs under way in the West is the building of the Exchequer Dam and Power House on the Merced River, California. Bent Brothers, Inc., of Los Angeles are the contractors and remarkable progress has been made on the job thus far.

The photograph of the dam which appears above was taken on Aug. 20, just one year after the signing of the contract. At that time 225,000 cu. yd. of concrete had been placed, 87,000 cu. yd. of excavation removed, 69,000 lb. of reinforcing steel placed, 723,075 lb. of metal work placed, 25,000 sq. ft. of metal work painted, 8000 ft. of drains placed, and 1600 ft. of conduit placed.

The superintendent in charge of the work for Bent Brothers is M. H. Slocum.

NIGHT WORK SPEEDS UP REPAIR JOBS

Bursting Water Mains Make Trouble in New York

AN epidemic of bursting water mains visited New York City recently and in various parts of the city streets were flooded and considerable damage was done. One of the breaks washed out the main line of the New York Central railroad and made it necessary to send out the Twentieth Century Limited over a back route.

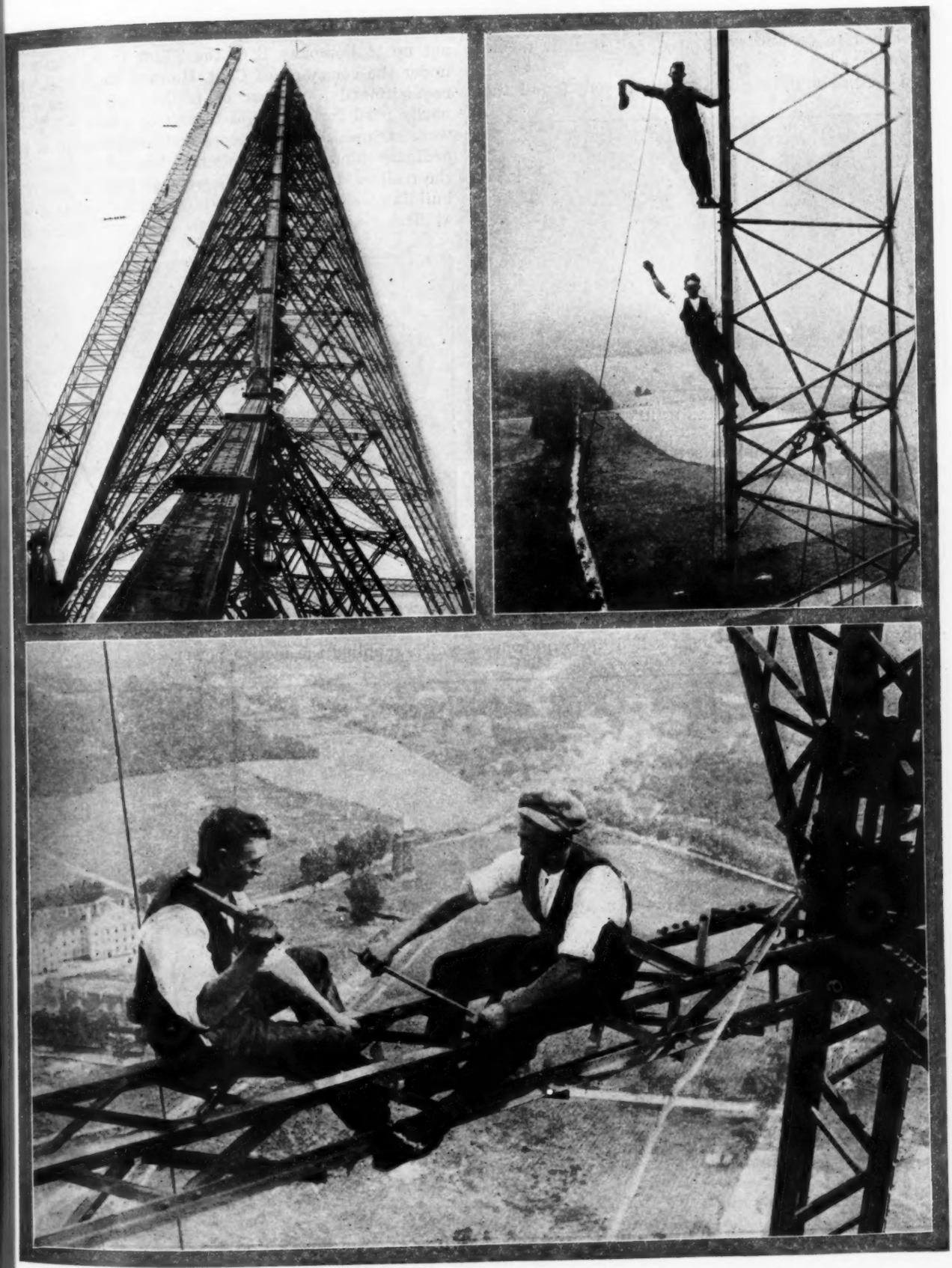
Several of the breaks occurred on Fifth Avenue, one of them happening at the corner of Forty-Second Street, one of the busiest street corners in the city. This made it necessary to close half of the street to traffic, detour the bus lines for several days and to work night and day on the job of repairing the main.

One of the photographs on this page shows the corner of Forty-Second Street and Fifth Avenue taken from the top of one of the nearby buildings while the pavement was torn up. The other shows the night gang at work with the aid of Carbic lights.

On emergency work of this sort in New York it has been found that even better speed can be made at night when traffic is comparatively light than during the day when in spite of all precautions the work is constantly being interrupted.

THE NIGHT GANG ON THE JOB

Working on the Skyline



American iron and steel workers have no monopoly on perilous occupations. The three photographs on this page show the construction of a radio mast near Berlin, Germany. This structure is 750 feet in height © *International*

THE ARMY MOVES A CHURCH

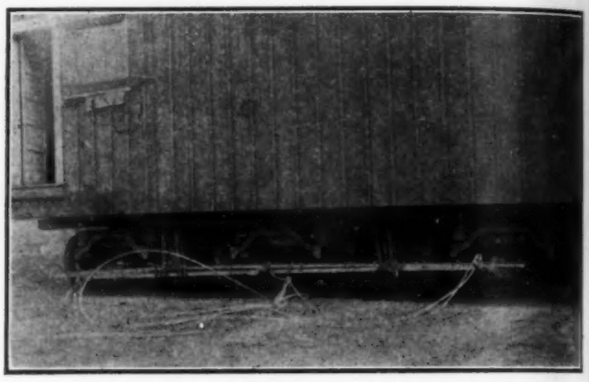
Using Military Equipment, Soldiers Transport Chapel Across Country

THE Army has to be ready to do anything it is asked to do and every now and then it tackles an unusual job.

At Schofield Barracks, Hawaii, it was found that the attendance at church service was not all that could be desired and in order to make it easier for the personnel of the post to go to church, it was decided to move the chapel from the upper post to the post community center. This meant that the building had to be moved a distance of 1¾ miles, and on the way cross a golf course and a parade ground. Incidentally, it had to be turned completely around.

SIDE VIEW SHOWING ARRANGEMENT OF TRAILERS

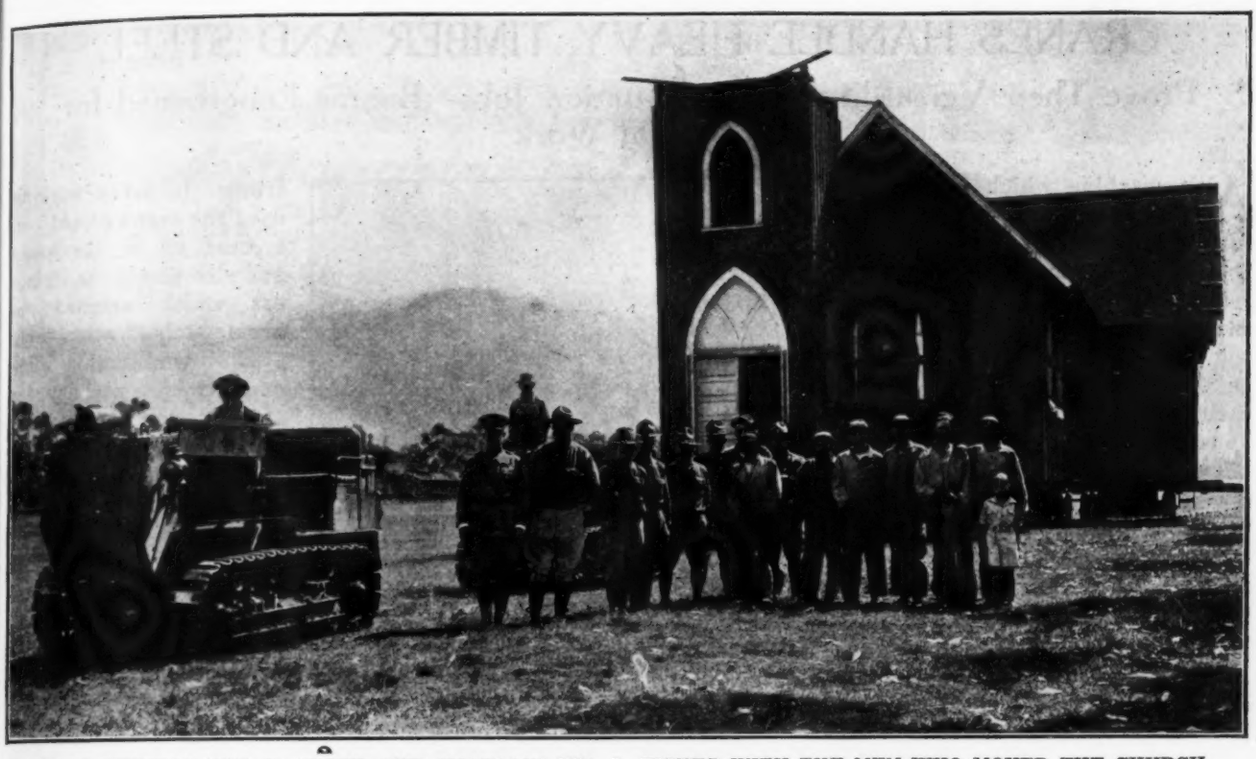
As the Army does not possess the equipment ordinarily used in moving buildings it had to do the work with the material at its command. The problem was put up to Company B of the Third U. S. Engineers under the command of Capt. Howard McC. Yost. He requisitioned a number of trailers which are ordinarily used for the rapid transit of artillery. These were stripped of their floors and used instead of the ordinary housemoving rollers. Spreaders separated the trailers, ten of which were used for the job. The building weighed approximately 30 tons and as it was at first placed on a subframe of heavy timber and raised upon the floor of the trailers, the aggregate load was approximately 40 tons.



ALL READY TO ATTACH THE TRACTORS

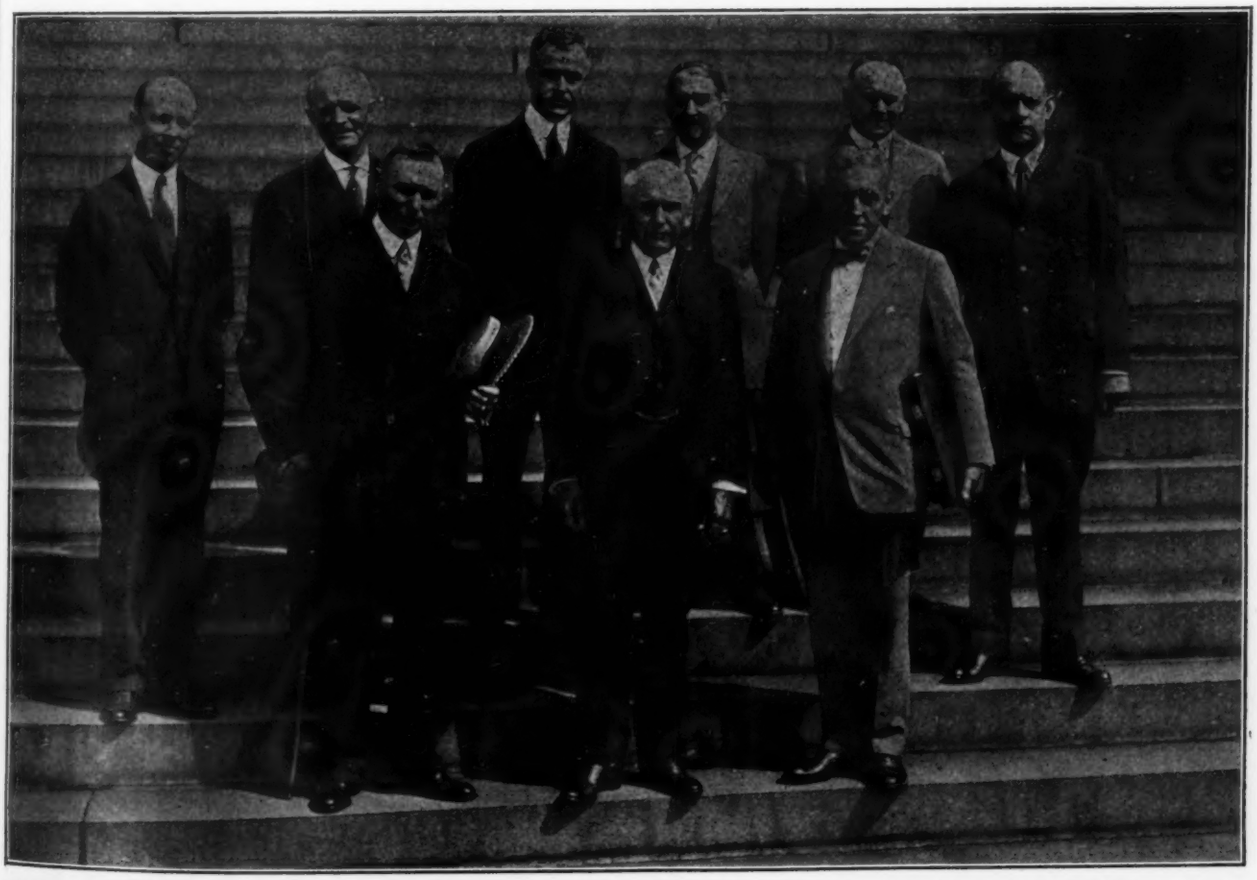
The artillery also furnished four 4-ton tractors which supplied the motive power.

THE CHAPEL ON THE WAY TO ITS NEW SITE



MAJOR-GENERAL WM. R. SMITH AND CHAPLAIN WM. L. FISHER WITH THE MEN WHO MOVED THE CHURCH

THE U. S. DELEGATES TO THE PAN AMERICAN ROAD CONGRESS VISIT THE SECRETARY OF STATE



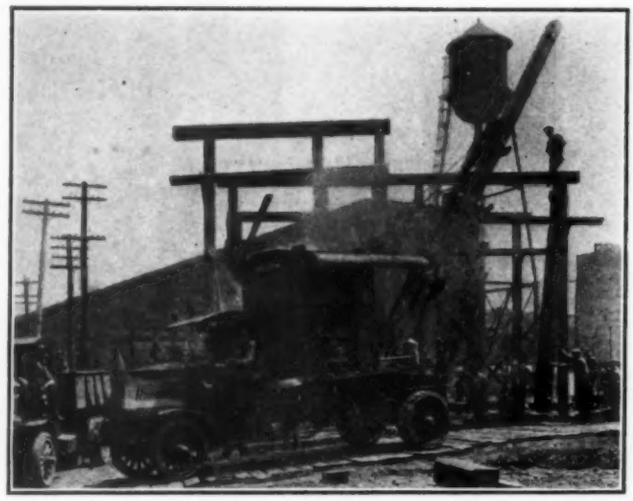
LEFT TO RIGHT FRONT ROW—CONGRESSMAN WM. E. HULL OF ILLINOIS, SECRETARY OF STATE FRANK B. KELLOGG, HERBERT H. RICE, DETROIT, CHAIRMAN OF THE COMMISSION. BACK ROW—PYKE JOHNSON, SECRETARY; CHAS. M. BABCOCK, MINNESOTA COMMISSIONER OF HIGHWAYS; DR. G. A. SHERWELL, DEAN A. N. JOHNSON, UNIVERSITY OF MARYLAND; THOMAS H. MAC DONALD, CHIEF U. S. BUREAU OF PUBLIC ROADS, AND FRANK PAGE, CHAIRMAN OF NORTH CAROLINA STATE HIGHWAY COMMISSION.

CRANES HANDLE HEAVY TIMBER AND STEEL

Prove Their Versatility on Construction Jobs—Booms Lengthened for Special Work

ANY machine which is adaptable to different sorts of work is a valuable unit in a contractor's construction plant. The two Universal cranes shown in the photographs on this page are proving their versatility by doing unusual work.

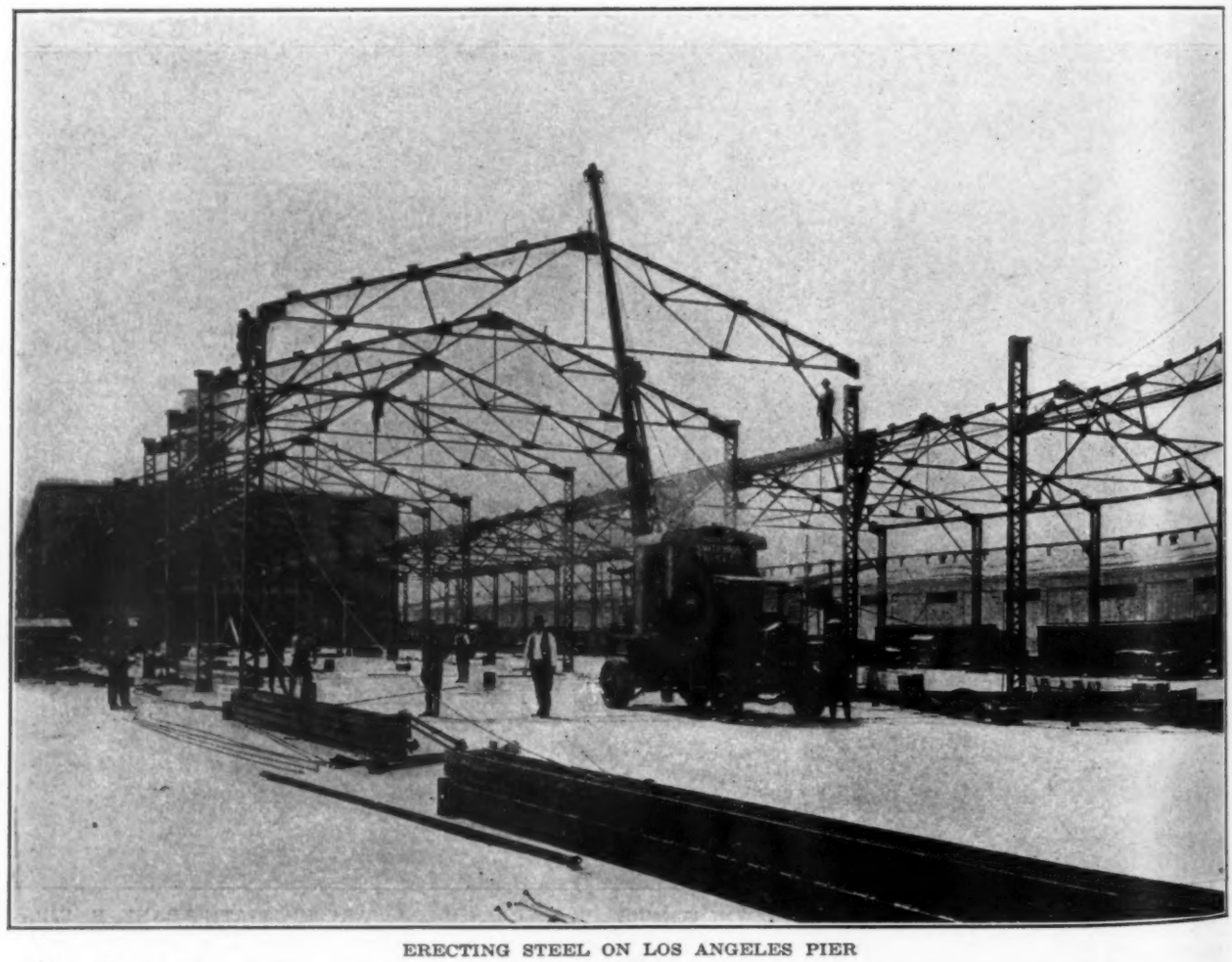
The crane shown in the photograph at the top of this page, which is mounted on a Mack truck, is engaged in putting up heavy timber bents on the approach to the Manchester Bridge in Pittsburgh. A ramp 1000 ft. in length was constructed and consisted of heavy timber bents with 35-ft. stringers resting on top. In order to handle this work a 40-ft. timber was lashed to the regular 20-ft. boom of the crane. In seven working days the crane placed and erected all of the bents and also placed the stringers which weighed approximately 2½ tons each.



SETTING UP HEAVY TIMBER BENTS

Last winter this same crane was kept busy for several months removing false work from under the newly completed Jack's Run Bridge in a place where it saved considerable money and where cramped quarters prohibited the use of a large machine.

The crane in the photograph at the bottom of the page is owned by the Smith Brothers Truck Co. at Los Angeles and is shown at work erecting steel on a new pier. In this case also a timber was used to lengthen the boom.



ERECTING STEEL ON LOS ANGELES PIER